Incorporating the Use of PV with the Navajo Tribal Utility Authority and the Rural Utility Service

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ABSTRACT

Sandia National Laboratories is developing a strong relationship with the Navajo Nation. Sandia's activities with the Navajo Tribal Utility Authority (NTUA) are leading this development effort. Specifically, Sandia has been providing PV technical assistance directly to NTUA. Sandia's Photovoltaics Program has grown this relationship through joint formation of strategic multi-year plans oriented toward the development of sustainable Native American renewable energy projects and associated business development.

In parallel, Sandia has developed a partnership with the US Department of Agriculture's (USDA) Rural Utility Service (RUS). RUS administers a $33B revolving loan fund that lends money to rural electrical cooperatives at very favorable rates and long terms. NTUA is a qualifying rural electrical cooperative. Recently, NTUA received a RUS loan to support its successful PV program with 200 home systems spread throughout the rural reservation areas of Arizona and New Mexico. This loan is the first-ever non-hydropower renewable energy technology loan made by RUS.

The NTUA PV program serves as model for other tribes, and their experiences can directly apply to rural utilities across the nation. If successful, the Program can lead to the opening of a large sustainable market for PV with the rural electrical cooperatives.

GENERAL INFORMATION

In December 2000, Sandia National Laboratories, Navajo Nation and the Department of Energy signed a Memorandum of Understanding (MOU), which authorizes collaboration and technology transfer for the Navajo Nation. The collaboration emphasizes energy, environment, education, economic development, and communication. Energy, of course, is very key to the MOU. Besides being explicitly identified as a subject for cooperation, it is an enabler of all of the remaining explicitly mentioned cooperation areas.

Out of the 250,000 enrolled members, approximately 152,200 Navajos reside on the reservation, which covers 17 million acres. Approximately 10,000 Navajo homes are currently without electrical power, and the average cost to extend the electrical grid is about $25,000 per mile.

NTUA serves as the Navajo's cooperative electrical utility. Throughout their service area, 200 photovoltaic systems have been purchased and installed by NTUA at individual residences.

Sandia National Labs has been providing technical assistance and training to NTUA for their current 640 Watt off-grid photovoltaic systems. Sandia and its partners at New Mexico State University's Southwest Technology Development Institute (SWTDI) have trained the majority of the NTUA electricians, engineers and customer service technicians. Other assistance included monitoring performance/operation of PV systems in the field and conducting performance tests on NTUA systems at Sandia.

Future plans include providing assistance on sustainability issues, maintenance process development and other technical training activities. Also planned are determination of life-cycle costs of fielded stand-alone PV systems, monitoring of and data collection from installed systems, continued technical assistance and capacity building, business development geared toward sustainability and growth of present activities, monitoring and regular evaluation of installed projects, as well as the overall implementation plan.

CUSTOMER FORUMS

Currently, Navajo customers lease the PV systems from NTUA and are charged through their utility bill. The lease includes NTUA provided maintenance and service. All Balance of System

components are sealed and accessible only to NTUA personnel. The customer owns the system after 15 years.

It is important that end users of these systems understand the system's capabilities and limitations. For example, new users of the systems are so pleased with the benefits of having electricity in their homes for the first time that they attempt to power appliances and tools that overload the systems. To communicate system capabilities, limitations and proper operation, the NTUA/Sandia team piloted a customer forum to address these issues. The first forum was held in NTUA's Kayenta District. This site was chosen as the majority of the NTUA systems are installed in this District.

The first forum was held in the Community Chapter House in Kayenta, Arizona. The forum provided a platform for presenting information on understanding photovoltaics and the PV system in general. Considerable time for questions and answers was provided, along with an opportunity for customers to see the components of the system in a supervised manner. It was accompanied by a live radio broadcast, all in the Navajo language, which covered the majority of the reservation and helped to promote PV and the NTUA program.

The NTUA Kayenta District electrician and her helper, along with assistance from Sandia National Labs' technical staff and support from staff from the Southwest Technology Development Institute, conducted the forum. More events are being planned for this next fiscal year.

RURAL UTILITY SERVICE PARTNERSHIP

Sandia sees working with RUS as a excellent opportunity to develop a new domestic market for US PV technology. PV is cost-effective now in many rural applications. The low interest, long-term loans available to rural cooperatives through RUS make these PV applications even more attractive economically. What remains to be demonstrated to RUS is the sustainable and reliable performance of PV technology in the rural cooperative environment. Sandia/SWTDI, through the NTUA partnership, are working to make this demonstration. Specifically, Sandia is assisting in developing a material list to include PV; compiling dealer, factory and new product information; assisting with developing planning tools; and learning from the co-operative's experience with fielded PV systems.

Sandia is also assisting to understand costs including maintenance costs. RUS already requires operations and maintenance records. The Sandia database is being used to collect and analyze this data.

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